Complete Summary

GUIDELINE TITLE

The diagnosis and management of sinusitis: a practice parameter update.

BIBLIOGRAPHIC SOURCE(S)

Slavin RG, Spector SL, Bernstein IL, Kaliner MA, Kennedy DW, Virant FS, Wald ER, Khan DA, Blessing-Moore J, Lang DM, Nicklas RA, Oppenheimer JJ, Portnoy JM, Schuller DE, Tilles SA, Borish L, Nathan RA, Smart BA, Vandewalker ML, American Academy of Allergy, Asthma and Immunology, American College of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology. The diagnosis and management of sinusitis: a practice parameter update. J Allergy Clin Immunol 2005 Dec;116(6 Suppl):S13-S47. [288 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Parameters for the diagnosis and management of sinusitis. Ann Allergy Asthma Immunol 1998 Dec;102(6 Pt 2):S107-S144. [377 references]

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse (NGC): This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- July 08, 2008 - Fluoroquinolones (ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, moxifloxacin, gemifloxacin): A BOXED WARNING and Medication Guide are to be added to the prescribing information to strengthen existing warnings about the increased risk of developing tendinitis and tendon rupture in patients taking fluoroquinolones for systemic use.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Sinusitis and its predisposing factors

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Allergy and Immunology
Family Practice
Geriatrics
Internal Medicine
Otolaryngology
Pediatrics
Preventive Medicine

INTENDED USERS

Health Care Providers
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To provide a ready reference for any physician who evaluates and treats a patient with suspected sinusitis
- To provide guidance about referral of refractory cases

TARGET POPULATION

Adults and children with suspected sinusitis

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Clinical history and physical examination

2. Sinus imaging studies including standard radiographs, computed tomography (CT), magnetic resonance imaging (MRI), and ultrasonography
3. Laboratory tests including nasal cytology, a sweat chloride test, ciliary function studies, and test for immunodeficiency
4. Rhinolaryngoscopy, endoscopic rhinoscopy
5. Biopsy of the nose and paranasal sinuses
6. Evaluation of risk factors

Treatment

1. Medical management
    - First line: Antibiotics (amoxicillin [with or without clavulanate], trimethoprim sulfamethoxazole, cephalosporins, macrolides, quinones)
    - Other measures: Antihistamines, alpha -adrenergic decongestants, glucocorticosteroids, adjunctive therapies including saline spray or lavage
    - Intravenous immune globulin, for individuals with impaired humoral immunity
    - Oral quinolone, for older children and adults with cystic fibrosis
2. Consultation and referral to a specialist in specific clinical situations
3. Patient education
4. Surgical referral for antral puncture and irrigation; functional endoscopic sinus surgery

MAJOR OUTCOMES CONSIDERED

- Symptomatic relief
- Resolution of signs of sinusitis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Ia Evidence from meta-analysis of randomized controlled trials

Ib Evidence from at least one randomized controlled trial

IIa Evidence from at least one controlled study without randomization

IIb Evidence from at least one other type of quasi-experimental study

III Evidence from nonexperimental descriptive studies, such as comparative studies

IV Evidence from expert committee reports or opinions, clinical experiences of respected authorities, or both

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

A. Directly based on category I evidence

B. Directly based on category II evidence or extrapolated recommendation from category I evidence

C. Directly based on category III evidence or extrapolated recommendation from category I or II evidence

D. Directly based on category IV evidence or extrapolated recommendation from category I, II, or III evidence

NR Not rated

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

An initial draft of parameters was prepared by a work group of experts in the field who carefully reviewed the current medical literature. This material then underwent extensive peer review, revision, and annotation by external reviewers and by the Joint Task Force on Practice Parameters for Allergy and Immunology, a national panel of allergist-immunologists appointed by its cosponsoring organizations: the American Academy of Allergy, Asthma and Immunology; the American College of Allergy, Asthma and Immunology; and the Joint Council of Allergy, Asthma and Immunology. The parameters were reviewed and approved by the cosponsoring organizations and thereby represent an evidence-based, broadly accepted consensus opinion.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

This practice parameter includes an algorithm on the diagnosis and management of food allergy accompanied by annotations (numbered to correspond with the algorithm). Guideline recommendations are presented in the form of summary statements. After each statement is a letter in parentheses that indicates the strength of the recommendation. Categories of evidence (Ia, Ib, IIa, IIb, III, IV, LB) and strength of recommendations (A-F) are defined at the end of the "Major Recommendations" field.

Annotations

1. Symptoms suggestive of acute sinusitis
    - Acute sinusitis typically presents as a persistent upper respiratory tract infection (10-14 days without improvement).
    - In adults prominent symptoms include nasal congestion, purulent rhinorrhea, postnasal drainage, facial or dental pain, headache, and cough, frequently with a more severe nocturnal component.
    - Any patient with orbital swelling or pain, swelling of the forehead, and/or diplopia should be urgently scheduled for evaluation.
    - Children with acute sinusitis might also exhibit increased irritability and vomiting occurring in association with gagging on mucus, prolonged cough, or both.
    - In all age groups less frequent symptoms associated with acute sinusitis include fever, nausea, malaise, irritability, fatigue, halitosis, hyposmia, and sore throat.

2. Office visit
    - Review medical history for diagnosis of sinusitis and underlying risk factors.
    - General examination includes an evaluation for signs of upper airway and sinus inflammation associated with nasal mucosal edema, purulent

secretions, and increased localized blood flow. Typical clinical signs include tenderness overlying the sinuses, dark circles beneath the eyes, and/or periorbital edema. Pharyngeal erythema, lymphoid hyperplasia, and purulent material in the posterior pharynx are also frequently observed.

- Nasal examination in patients with acute sinusitis might reveal mucosal erythema and purulent secretions. Nasal endoscopy, whether performed with a rigid or fiberoptic instrument, offers a significantly better view than a nasal speculum. Nasal polyps might contribute to nasal congestion and can be a source of recurrent sinusitis by obstructing the sinus ostia. In adults nasal polyps might be associated with nonsteroidal anti-inflammatory drug sensitivity and asthma. Nasal polyps are relatively uncommon in children, and their presence should prompt evaluation for possible cystic fibrosis (CF). Ear examination in patients with suspected acute sinusitis frequently will reveal middle ear effusions and associated eustachian tube dysfunction.
- Acute or chronic sinusitis might initiate or worsen asthma and bronchial hyperresponsiveness. Accordingly, chest auscultation and other objective measurements of airflow obstruction, such as office spirometry, should be considered in any patient with possible sinusitis and cough.
- Patients with obvious acute sinusitis should be carefully reviewed for any possible evidence of complicating factors, including the presence of facial swelling–erythema over an involved sinus, visual changes, abnormal extraocular movements, proptosis, periorbital inflammation–edema–erythema, any suggestion of intracranial involvement, or central nervous system involvement manifested as abnormal neurologic signs.
- In general, radiographs are not necessary in making the diagnosis of acute sinusitis, and plain radiographs have significant false-positive and false negative results. Occasionally, imaging studies might be useful to support the diagnosis or provide evidence of the degree of mucosal involvement, thereby guiding more aggressive therapy. Plain radiographic signs compatible with sinusitis include greater than 6 mm of mucosal thickening in the maxillary sinuses in adults (>4 mm in children), greater than 33% loss of air space volume within the maxillary sinuses, or opacification–air-fluid levels in any of the paranasal sinuses. Occipitomental view radiographs might be helpful in screening adults and children older than 1 year of age but have inadequate sensitivity. A limited coronal sinus computed tomography (CT) scan, with a focus on the ostiomeatal complex, might be helpful and should be considered if imaging is deemed necessary. Axial and coronal sinus CT is indicated in suspected orbital involvement, and sinus magnetic resonance imaging (MRI) can provide useful information with related soft tissue involvement.
- Nasal cultures are not reliable for establishing the diagnosis of sinusitis or for determining a specific causative microorganism. Maxillary antrum aspiration for culture is definitive but is indicated only when precise microbial identification is essential. Obtaining cultures of the middle meatus through endoscopically directed culture has shown promise in adults but not in children.

3. Acute sinusitis

- Acute sinusitis is defined as symptoms and signs or less than 4 weeks. The diagnosis of acute sinusitis is based primarily on the clinical history, the physical examination, and possibly other ancillary evaluations, including nasal cytology or radiographic imaging. In most instances the diagnosis is made presumptively, and treatment is initiated. Clinical improvement usually occurs promptly; complete resolution of symptoms might require 10 to 14 days.

4. Other diagnoses

   Differential diagnoses include the following:

   - Allergic rhinitis (AR) and nonallergic rhinitis (NAR)
   - Viral upper respiratory tract infection
   - Nasal polyps
   - Sinonasal tumors
   - Nasopharyngeal tumor, granulomata, dental infections
   - Enlarged or infected adenoids in children

5. Treatment

   Antibiotics

   - Amoxicillin often is the drug of choice for children and adults. It is generally effective, inexpensive, and well tolerated. Trimethoprim-sulfamethoxazole can be used as an alternative drug in adults. Resistance is more commonly seen in children, and it is recommended that the clinician refer to their local biogram profile of antibiotic resistance. For patients who do not respond to amoxicillin, high-dose amoxicillin-clavulanate (90 mg/kg amoxicillin and 6.4 mg/kg clavulanate, not to exceed 2 g every 12 hours) is recommended. For patients allergic to or intolerant of amoxicillin, alternatives include cephalosporins, macrolides, or quinolones.
   - Acute sinusitis generally responds to treatment for 10 to 14 days. Some physicians continue treatment for 7 days after the patient is well to ensure complete eradication of the organism and prevent relapse. It is important to instruct the patient to complete the course of antibiotics.
   - A reasonable approach would be to start the patient on amoxicillin for 3 to 5 days and determine whether the signs and symptoms are improving. If the patients symptoms are improving, continue this treatment until the patient is well for 7 days (generally a 10- to 14-day course). If after 3 to 5 days the patient has not shown improvement, switch to a different antibiotic, such as high-dose amoxicillin-clavulanate or cefuroxime axetil.

   Corticosteroids

   - The use of nasal corticosteroids might be helpful in patients with acute and chronic sinusitis.
   - Although efficacy has not yet been proved, the short-term use of oral corticosteroids as an adjunct in treating patients with acute sinusitis is

reasonable when the patient fails to respond to initial treatment, demonstrates nasal polyposis, or has demonstrated marked mucosal edema.

Saline-mucolytics

- Saline nasal sprays or lavage might be a useful adjunct by liquefying secretions and decreasing the risk of crusting near the sinus ostia.
- There is no conclusive evidence that mucolytics, such as guaifenesin, are useful adjuncts in treating acute sinusitis.

Alpha-Adrenergic Decongestants

- Topical decongestants (e.g., oxymetazoline and phenylephrine) and oral decongestants (e.g., pseudoephedrine) reduce mucosal blood flow, decrease tissue edema and nasal resistance, and might enhance drainage of secretions from the sinus ostia.
- The use of topical decongestants beyond 3 to 5 days might induce rhinitis medicamentosa, with associated increased congestion and refractoriness to subsequent decongestant therapy.

Education

- The following comfort measures might be helpful: adequate rest, adequate hydration, analgesics as needed, warm facial packs, steamy showers, and sleeping with the head of the bed elevated.
- Prevention measures might include appropriate treatment of allergies and viral upper respiratory tract infections and avoidance of adverse environmental factors, such as relevant allergens, cigarette smoke, pollution, and barotrauma.
- Patients should be instructed to phone if symptoms worsen (e.g., especially with headache or high fever) or if symptoms have not improved within 3 to 5 days of treatment (see annotation 10 in the original guideline document).

6. Treatment successful?

Complete Response

- Patient is improved symptomatically to near normal.

Partial Response

- Patient is symptomatically improved but not back to normal at the end of the first course of antibiotics.

Poor Response

- Patient has little or no symptomatic improvement after the first course of antibiotic therapy.

7. Follow-up
    - No further evaluation for resolved uncomplicated sinusitis.
    - Consider further evaluation of underlying risk factors, such as allergic rhinitis (AR) and NAR and structural abnormalities.

8. Additional treatment and evaluation
    - For partial response, continue antibiotic treatment for another 10 to 14 days or consider antibiotic choices listed under "poor responses."
    - For poor response to treatment with amoxicillin or trimethoprim-sulfamethoxazole or in regions with a high incidence of antibiotic resistance, an antibiotic should be prescribed that covers resistant bacteria. Appropriate choices include high-dose amoxicillin-potassium clavulanate, cefuroxime, cefpodoxime, cefprozil, and cefdinir. Quinolones, macrolides, and ketolides might also be a consideration.
    - Sinusitis that fails to improve after 21 to 28 days of initial antibiotic treatment might be caused by pathogens not adequately covered by prior antibiotics, the presence of nasal polyps, or noncompliance. The use of broader-spectrum single agents, such as high-dose amoxicillin-potassium clavulanate, cefuroxime, or cefpodoxime should be considered with or without the addition of anaerobic coverage with clindamycin or metronidazole.
    - Reinforce the comfort and prevention measures outlined in Annotation 5 in the original guideline document.
    - Consider sinus CT scan if not already done.
    - Underlying risk factors should be evaluated in a more detailed manner.
    - Consider consultation with an allergist-immunologist for treatment of underlying allergic factors and evaluation of unusual pathogens and immunodeficiency. For structural abnormalities, consultation should be sought with an otolaryngologist.

Recurrent Sinusitis

- Repeated episodes of acute sinusitis typically 3 or more times per year.
- Patients with chronic or recurrent sinusitis should be evaluated for underlying inflammation, allergy, immunodeficiency, and anatomic abnormalities.

Rhinitis

- Patients with suspected AR in conjunction with sinusitis should be evaluated for the presence of immunoglobulin E (IgE) sensitization to inhalant allergens.
- Emphasis of therapy for AR includes environmental control, pharmacotherapy, and, in selected patients, allergen immunotherapy.
- Other rhinitic conditions (vasomotor, nonallergic rhinitis–eosinophilia syndrome [NARES], and rhinitis medicamentosa) might also lead to sinusitis, and the consultant must be capable of differentiating these conditions and initiating an appropriate course of therapy.

Immunodeficiency

- Referral to an allergist-immunologist is particularly indicated in patients with chronic or recurrent sinusitis associated with such conditions as otitis media, bronchitis, bronchiectasis, or pneumonia and in patients who have undergone prior surgical procedures and continue to experience sinusitis. This evaluation might include measurement of quantitative serum IgG, IgA, and IgM level and assessment of specific antibody responses to protein and polysaccharide antigens, such as tetanus toxoid or pneumococcal polysaccharide vaccine.

9. Treatment successful?
    - See Annotation 6 in the original guideline document.

    Follow-up

    - See Annotation 7 in the original guideline document.

10. Chronic sinusitis
    - Signs and symptoms compatible with sinusitis persisting 8 weeks or longer.
    - Consider a noninfectious form of sinusitis. Chronic hyperplastic eosinophilic rhinosinusitis does not respond to antibiotics and is marked by a preponderance of eosinophils and mixed mononuclear cells, with a relative paucity of neutrophils. A course of systemic corticosteroids might have to be considered.
    - If the patient has a significant nasal septal deviation that compresses the middle turbinate into the ostiomeatal complex or obstruction of the sinus outflow tracts caused by middle turbinate deformity or the presence of accessory structures that block sinus drainage, consider consultation with an otolaryngologist. The presence of obstructing nasal polyps, after an appropriate course of treatment that might include a trial of oral corticosteroids, is also an indication for referral. Finally, a patient with recurrent or chronic symptoms and radiographic evidence of ostiomeatal obstruction despite aggressive medical management might also benefit from surgical intervention.
    - Evaluation should include coronal sinus CT with extra cuts through the ostiomeatal complex to clarify the extent of disease and specific location or locations.
    - Evaluation might also include nasal-sinus biopsy in suspected cases of neoplasia, fungal disease, granulomatous disease, or tracheal biopsy for evaluating ciliary structures, function, or both.
    - In general, every effort should be made to maximize medical treatment for underlying rhinitis before proceeding with surgical intervention.
    - Contemporary surgical therapy involves chiefly functional endoscopic sinus surgery.
    - Most patients benefit from continued individualized medical therapy, including, when indicated, allergy management, after surgery.

Summary Statements

1. It has been suggested that the term *sinusitis* be replaced by *rhinosinusitis*. **(NR)**
2. Sinusitis is defined as inflammation of one or more of the paranasal sinuses. The most common cause of sinusitis is infection. Classification of sinusitis is frequently based on duration of symptoms, the specific sinus involved, or both. **(NR)**
3. The most commonly used classification is as follows **(NR)**:
    a. Acute sinusitis: symptoms for less than 4 weeks consisting of some or all of the following: persistent symptoms of an upper respiratory tract infection, purulent rhinorrhea, postnasal drainage, anosmia, nasal congestion, facial pain, headache, fever, cough, and purulent discharge.
    b. Subacute sinusitis: (unresolved acute) symptoms from 4 to 8 weeks.
    c. Chronic sinusitis: symptoms for 8 weeks or longer of varying severity consisting of the same symptoms as seen in acute sinusitis. In chronic sinusitis there should be abnormal findings on CT or Magnetic resonance imaging (MRI). Some patients with chronic sinusitis might present with vague or insidious symptoms.
    d. Recurrent sinusitis: 3 or more episodes of acute sinusitis per year. Patients with recurrent sinusitis might be infected by different organisms at different times.
4. A noninfectious form of chronic sinusitis is termed *chronic hyperplastic eosinophilic sinusitis*. **(NR)**

Anatomic Considerations

5. The sinuses develop at different ages during childhood. **(B)**
6. The optic nerve, cavernous sinus, and carotid artery are adjacent to the sphenoid sinus. Tumors and infection in the sphenoid sinus might present with involvement of these structures. **(B)**
7. Because of the location of the frontal and sphenoid sinuses, infection of these sinuses has a greater propensity to cause intracranial complications. **(A)**
8. The maxillary, anterior ethmoid, and frontal sinuses drain through the ostiomeatal complex and are dependent on this region for normal ventilation and mucociliary clearance. **(B)**
9. The anterior ethmoid sinuses and middle meatus (ostiomeatal complex), as a result of their location, are most frequently involved in sinusitis. **(D)**
10. Anatomic abnormalities of the nasal septum or within the ostiomeatal complex might predispose toward the development of sinusitis. **(B)**

Microbiology

Bacterial

11. In acute sinus disease viral upper respiratory tract infections frequently precede bacterial superinfection by *Streptococcus (S) pneumoniae*, *Haemophilus (H) influenzae*, and *Moraxella (M) catarrhalis*. Both *M catarrhalis* and *H influenzae* can produce beta-lactamase and thereby be resistant to penicillin and its derivatives. **(A)**
12. The prevalence of penicillin resistant *S pneumoniae* is increasing. Twenty-five percent to 50% of respiratory isolates of *S pneumoniae* are resistant to penicillin. **(A)** There is wide geographic variation.

13. In addition to the organisms mentioned above, the most common bacterial species in chronic sinusitis are *Staphylococcus (S) aureus*, gram-negative enteric organisms (including *Pseudomonas (P) aeruginosa*), and anaerobes, such as Prevotella species and fusobacteria. **(A)** The role of infection in most patients with this disorder is controversial, and these culture results are similarly controversial and might reflect colonization only.
14. In contrast to community acquired sinusitis, the usual pathogens in nosocomial sinusitis are gram-negative enterics (e.g., *P aeruginosa, Klebsiella pneumoniae, Enterobacter species, Proteus mirabilis, Serratia marcescens*, and bacteroides) and gram-positive cocci (occasionally streptococci and staphylococci). **(A)**

Fungal

15. Fungal sinusitis can take one of 3 forms: allergic fungal sinusitis, mycetoma, or fulminant invasive disease. **(A)**
16. Common causes of allergic fungal sinusitis are Bipolaris species, Curvularia species, Aspergillus species, and Drechslera species. **(A)**

Clinical Diagnosis

History

17. Acute bacterial sinusitis is suspected in patients in whom upper respiratory tract infection persists beyond 10 to 14 days. A history of persistent purulent rhinorrhea, postnasal drainage, and facial pain correlates with increased likelihood of bacterial disease. **(A)**
18. Prominent symptoms of acute bacterial sinusitis include nasal congestion, purulent rhinorrhea, facial-dental pain, postnasal drainage, headache, and cough. **(C)**
19. Predisposing factors for sinusitis include environmental exposures, genetic predisposition, AR, eosinophilic NAR, VMR, rhinitis medicamentosa, nasal polyps and other causes of ostiomeatal obstruction, CF, ciliary dyskinesia, cocaine abuse, and immunodeficiency. **(D)**
20. The diagnosis of sinusitis is based on a combination of clinical history, physical examination, imaging studies, and/or laboratory tests. **(D)**
21. The differential diagnosis of sinusitis includes AR, eosinophilic NAR, vasomotor rhinitis (VMR), and vascular headaches-migraines. **(D)**

Physical Examination

22. Clinical signs of acute sinusitis include sinus tenderness on palpation, mucosal erythema, purulent nasal secretions, increased pharyngeal secretions, and periorbital edema. **(C)**
23. Rhinolaryngoscopy might be a useful adjunct to physical examination, providing direct visualization of abnormalities of the septum, turbinates, mucosa, nasopharynx, adenoids, eustachian tube orifice, tonsils, posterior tongue, epiglottis, glottis, and vocal cords. The origin and extent of nasal polyps might be better identified after the use of topical decongestants, as well as the presence of purulent ostial secretions. **(D)**

Imaging Studies

24. Imaging techniques can provide confirmatory evidence when symptoms are vague, physical findings are equivocal, or clinical disease persists despite optimal medical therapy. **(B)**
25. Ultrasonography has limited utility but might be useful in pregnant women or for determining amounts of retained sinus secretions. **(C)**
26. Standard radiographs might be used to detect acute sinusitis, but they are not sensitive, particularly for ethmoid disease. **(C)**
27. CT is the optimal technique for evaluating the ethmoid sinuses and for preoperative evaluation of the nose and paranasal sinuses, including assessment of the ostiomeatal complex areas. **(C)**
28. MRI is a sensitive technique for evaluating suspected fungal sinusitis and for differentiating between inflammatory disease and malignant tumors. MRI is limited in its ability to define bony anatomy. **(C)**

Laboratory Tests

29. Laboratory evaluation of acute, chronic, or recurrent sinusitis might include the following: nasal cytology, nasal-sinus biopsy, or tests for immunodeficiency, cystic fibrosis (CF), or ciliary dysfunction. **(NR)**
30. Nasal cytology is useful in the evaluation of conditions associated with sinusitis, including AR, eosinophilic NAR, neutrophilic rhinitis, and VMR. **(C)**
31. Nasal-sinus biopsy is useful in several clinical situations: determining whether a lesion is neoplastic and, if so, its nature; confirming the presence of fungal disease; confirming the presence of granulomatous disease; and determining the ultrastructure of cilia. **(C)**

Predisposing Factors

Viral Infections

32. Acute viral upper respiratory tract infections often precede acute bacterial sinusitis. **(B)**
33. Viral upper respiratory tract infections are often (40% to 90% of the time) associated with CT evidence of sinusitis. Viral sinusitis appears to resolve within 21 days without the need for antibiotics. **(B)**
34. There is minimal evidence that viruses play a role in chronic sinusitis. **(B)**

Allergic Rhinitis (AR)

35. AR commonly precedes the development of recurrent or chronic sinusitis. The nasal obstruction and inflammation associated with AR interrupts normal mucociliary clearance and leads to retention of secretions within the sinus cavities. **(B)**
36. Patients with recurrent or chronic sinusitis should be evaluated for the presence of underlying allergy. **(B)**

Nonallergic Rhinitis (NAR)

37. NAR has a much higher prevalence than usually suspected. **(B)**
38. The primary symptoms associated with NAR, congestion and increased secretions, are often found in patients with sinusitis. **(B)**

39. NAR is one of the most frequent diseases occurring in patients with chronic sinusitis and might predispose toward the development of sinusitis. **(B)**

Gastroesophageal Reflux Disease (GERD)

40. GERD has been suggested as a cause of sinusitis. **(D)**
41. pH probe monitoring of both children and adults with chronic sinusitis shows a high incidence of both esophageal and nasopharyngeal reflux. **(B)**
42. Medical treatment of GERD in children and adults has been shown to result in significant improvement in sinusitis symptoms. **(B)**
43. In patients with sinusitis refractory to medical therapy, treatment of associated GERD should be considered before surgical intervention. **(B)**

Immunodeficiency

44. Immune deficiency should be considered in cases of sinusitis resistant to usual medical therapy. **(B)**
45. The majority of immunodeficient patients with recurrent sinusitis have defects in humoral immunity. However, other types of immunodeficiencies might present with recurrent sinusitis as one of their clinical features, including AIDS. **(B)**
46. The most common primary immunodeficiency disorders with recurrent sinusitis as a clinical feature are humoral immunodeficiencies, such as selective IgA deficiency and common variable immunodeficiency. Other primary immunodeficiencies that might present with recurrent sinusitis among other features include Wiskott-Aldrich syndrome, ataxia telangiectasia warts, hypogammaglobulinemia, infections, myelokathexis syndrome, and caspase-8 deficiency. **(C)**
47. Appropriate laboratory studies in patients with recurrent or chronic sinusitis might include quantitative immunoglobulin measurement (IgG, IgA, and IgM), specific antibody responses (tetanus toxoid and pneumococcal vaccine), and measurement of T-cell number and function (delayed hypersensitivity skin tests and flow cytometric enumeration of T cells). **(B)**

Cystic Fibrosis (CF)

48. Virtually all patients with CF have sinusitis as a consequence of dehydration of mucosal fluids and sulfation of mucous glycoproteins, a combination resulting in retention of viscous tenacious sinus secretions that predispose to bacterial infection. **(B)**
49. CF should be considered in any patient with chronic sinusitis at an early age or in children with nasal polyps. **(B)**
50. The sinus pathogens in patients with CF are similar to those that cause recurrent bronchial infection in these patients: *P aeruginosa*, *H influenzae*, *streptococci*, *Burkholderia cepacia*, *S aureus*, diphtheroids, and anaerobes. Fungi are also cultured frequently. This might result in an allergic fungal sinusitis similar pathologically to allergic bronchopulmonary aspergillosis. **(B)**
51. Younger children with CF with sinusitis not yet colonized with *Pseudomonas* species should be treated with a high dose and prolonged course (3-6 weeks) of antibiotics (e.g., amoxicillin-clavulanate, cefdinir, cefuroxime, or cefpodoxime). Older children typically need coverage for *P aeruginosa* with an oral quinolone (e.g., ciprofloxacin, levofloxacin, gatifloxacin, or moxifloxacin).

Treatment failures are common, and intravenous tobramycin, ceftazidime, or both or imipenem-meropenem are often required. **(A)**

Ciliary Dysfunction

52. Primary ciliary dyskinesia is a rare autosomal recessive group of disorders occurring in 1 in 20,000 live births. The majority of patients with ciliary dyskinesia have recurrent otitis media, sinusitis, and pneumonia with bronchiectasis. Nearly half of the patients have situs inversus with or without dextrocardia. **(B)**
53. Functional cilia tests include visual and videoscopic measurement of tissue and mucociliary transport; examples include the saccharin or disc movement tests. **(B)**
54. The saccharin test for mucociliary transport is useful for screening. In this test a small amount of saccharin is placed at the bottom of the inferior meatus. Normally, the patient should detect the saccharin within 6 to 10 minutes. Abnormal or equivocal results could be confirmed by means of nasal biopsy and electron microscopy. **(B)**
55. In cases of resistant bacterial sinusitis in which other underlying causes, such as immune deficiency, have been eliminated, consideration should be given to ciliary dysfunction. **(B)**

Associated Conditions

Otitis Media

56. Many similarities exist between otitis media and sinusitis, including histology, pathogenesis, and risk factors. **(A)**
57. Otitis media and sinusitis frequently coexist. **(A)**
58. In patients with acute bacterial sinusitis, one should look for the presence of otitis media. The converse is also true. **(A)**

Asthma

59. The association between sinusitis and asthma is extremely high. **(B)**
60. Although a number of theories have been proposed to explain this relationship, no direct causal factor has yet been found. **(D)**
61. Studies in both adults and children suggest that medical and surgical management of sinusitis results in objective and subjective improvement of asthma. **(C)**

Treatment

Medical

Antibiotics

62. Antibiotics are the primary therapy for bacterial sinusitis. **(A)**
63. The most common bacteria observed in acute sinusitis, recurrent acute sinusitis, and acute exacerbations of chronic sinusitis are *S pneumoniae*, *H influenzae*, and *M catarrhalis*. **(A)**

64. The appropriate duration of antibiotic therapy for acute sinusitis is not well defined. **(D)**
65. Choice of antibiotic should be based on predicted effectiveness, cost, and side effects. **(D)**
66. Antibiotic treatment of uncomplicated viral upper respiratory tract infection is inappropriate and discouraged strongly. **(D)**

Antihistamines

67. There are no data presently to recommend the use of H_1 antihistamines in acute bacterial sinusitis. **(D)**
68. There might be a role for antihistamines in chronic sinusitis if the underlying risk factor is AR. **(D)**

Alpha-Adrenergic Decongestants

69. Topical and oral decongestants are often used in the therapy of acute or chronic sinusitis because they decrease nasal resistance and theoretically increase ostial patency. **(D)**
70. Prospective studies are lacking and are needed to assess the value of alpha-adrenergic agents in the prevention or treatment of sinusitis. **(D)**

Glucocorticosteroids

71. The use of systemic corticosteroid therapy for sinus disease has not been studied systematically in a well-controlled or blinded manner. **(D)**
72. A few recent studies suggest that the addition of intranasal corticosteroids as an adjunct to antibiotic therapy might be modestly beneficial in the treatment of patients with recurrent acute or chronic sinusitis. **(C)**

Adjunctive Therapies: saline, mucolytics, and expectorants

73. There are several scientific studies that imply but do not directly confirm a role for these agents in sinusitis. **(D)**
74. Use of all these agents as prophylaxis for exacerbations of chronic sinusitis is empiric and not supported by clinical data. **(D)**
75. These agents are commonly used and in some instances might be beneficial in some patients. **(D)**

Intravenous Immunoglobulin (IVIG)

76. Immunodeficiency might be an underlying risk factor for the development of recurrent acute or chronic sinusitis. **(B)**
77. IVIG is approved as a replacement therapy for antibody deficiency disorders, including X-linked agammaglobulinemia, common variable immunodeficiency, Wiskott-Aldrich syndrome, and hyper-IgM syndrome. **(A)**
78. Appropriate use of IVIG can prevent complications from chronic sinusitis, including subperiosteal and intracranial abscesses, meningitis, sepsis, and death. **(B)**

Aspirin Desensitization Therapy

79. Beneficial effects of aspirin desensitization on patients with aspirin-exacerbated respiratory disease (AERD) have been reported. **(A)**

Surgical

80. Antral puncture and irrigation is an office procedure that has a place in the management of acute ethmomaxillary sinusitis refractory to medical therapy or in acute sinusitis in an immunosuppressed patient in whom early identification of pathogenic organisms is paramount. **(D)**
81. Surgical intervention might be required in acute sinusitis to provide drainage when there is a significant risk of intracranial complication or in a patient with periorbital or intraorbital abscess or visual compromise. **(D)**
82. Functional endoscopic sinus surgery, in combination with appropriate medical therapy, has been shown in uncontrolled studies to have long-term efficacy in reducing disease-specific symptoms and in improving overall quality of life. **(C)**

See the original guideline document for indications for referral.

Definitions:

Category of Evidence

Ia Evidence from meta-analysis of randomized controlled trials

Ib Evidence from at least one randomized controlled trial

IIa Evidence from at least one controlled study without randomization

IIb Evidence from at least one other type of quasi-experimental study

III Evidence from nonexperimental descriptive studies, such as comparative studies

IV Evidence from expert committee reports or opinions, clinical experiences of respected authorities, or both

Strength of the Recommendations

A. Directly based on category I evidence

B. Directly based on category II evidence or extrapolated recommendation from category I evidence

C. Directly based on category III evidence or extrapolated recommendation from category I or II evidence

D. Directly based on category IV evidence or extrapolated recommendation from category I, II, or III evidence

NR Not rated

CLINICAL ALGORITHM(S)

A clinical algorithm of sinusitis practice parameters is provided in the original guideline document.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations were based primarily on a comprehensive review of published reports. In cases where the data did not appear conclusive, recommendations were based on the consensus opinion of the group.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate diagnosis and management of sinusitis

POTENTIAL HARMS

Adverse effects of pharmacologic agents, including the following:

- Side effects of amoxicillin include gastrointestinal symptoms, such as cramping and diarrhea, might occur. These side effects usually reverse quickly when the agent is discontinued.
- Rebound hyperemia or chemical rhinitis is a frequent side effect [of decongestant use] in patients who use the drugs over an extended period of time. Oral decongestants cause generalized constriction of blood vessels, and increased arterial pressure is always of concern. Other possible adverse effects are reflex brachycardia, urinary retention, mydriasis (with effects on glaucoma), and effects on endocrine and other regulators of metabolic function.
- Surgical complications

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The American Academy of Allergy, Asthma and Immunology (AAAAI) and the American College of Allergy, Asthma and Immunology (ACAAI) have jointly accepted responsibility for establishing "The diagnosis and management of sinusitis: a practice parameter update." This is a complete and comprehensive document at the current time. The medical environment is a changing environment, and not all recommendations will be appropriate for all patients. Because this document incorporated the efforts of many participants, no single individual, including those who served on the Joint Task force, is authorized to

provide an official AAAAI or ACAAI interpretation of these practice parameters. Any request for information about or an interpretation of these practice parameters by the AAAAI or the ACAAI should be directed to the Executive Offices of the AAAAI, the ACAAI, and the Joint Council of Allergy, Asthma and Immunology. These parameters are not designed for use by pharmaceutical companies in drug promotion.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Slavin RG, Spector SL, Bernstein IL, Kaliner MA, Kennedy DW, Virant FS, Wald ER, Khan DA, Blessing-Moore J, Lang DM, Nicklas RA, Oppenheimer JJ, Portnoy JM, Schuller DE, Tilles SA, Borish L, Nathan RA, Smart BA, Vandewalker ML, American Academy of Allergy, Asthma and Immunology, American College of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology. The diagnosis and management of sinusitis: a practice parameter update. J Allergy Clin Immunol 2005 Dec;116(6 Suppl):S13-S47. [288 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 Dec (revised 2005 Dec)

GUIDELINE DEVELOPER(S)

American Academy of Allergy, Asthma and Immunology - Medical Specialty Society
American College of Allergy, Asthma and Immunology - Medical Specialty Society
Joint Council of Allergy, Asthma and Immunology - Medical Specialty Society

GUIDELINE DEVELOPER COMMENT

These parameters were developed by the Joint Task Force on Practice Parameters representing the American Academy of Allergy, Asthma and Immunology; the American College of Allergy, Asthma and Immunology; and the Joint Council of Allergy, Asthma and Immunology.

SOURCE(S) OF FUNDING

Funded by the American Academy of Allergy, Asthma, and Immunology (AAAAI), the American College of Allergy, Asthma, and Immunology (ACAAI) and the Joint Council of Allergy, Asthma and Immunology (JCAAI).

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Joint Task Force on Practice Parameters
Workgroup on Sinusitis

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**This parameter was edited by Dr Nicklas in his private capacity and not in his capacity as a medical officer with the Food and Drug Administration. No official support or endorsement by the Food and Drug Administration is intended or should be inferred.*

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

E. Wald has received grants from GlaxoSmithKline, MedImmune, and Sanofi Pasteur.

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M. Kaliner has consultant arrangements with Aventis, Medpoint, Glaxo, Gasser, Adams, and King; has received grants from numerous pharmaceutical companies that are researching allergies; and is on the speakers' bureau for Aventis, Medpoint, GlaxoSmithKline, Gasser, and Abbot.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Parameters for the diagnosis and management of sinusitis. Ann Allergy Asthma Immunol 1998 Dec;102(6 Pt 2):S107-S144. [377 references]

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Joint Council of Allergy, Asthma, and Immunology (JCAAI) Web site.

Print copies: Available from JCAAI, 50 N. Brockway, Ste 3-3 Palatine, IL 60067.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on June 29, 1999. The information was verified by the guideline developer on August 10, 1999. This NGC summary was updated by ECRI Institute on May 27, 2009. The updated information was verified by the guideline developer on July 9, 2009.

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Date Modified: 8/3/2009